Head injuries in infants caused by falls from surfaces while restrained in car seats

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Modern car safety seats are portable and babies are commonly left strapped in them in the home while they finish their sleep or parents attend to household chores. We report on two infants who sustained head injuries when falling from a surface where they had been restrained in a car seat.

CASE HISTORIES

Case 1

A baby boy had a normal neonatal and developmental course until he was four months old. His parents frequently left him strapped in the car seat on the kitchen table and in the last weeks before the accident had noted that he was rocking the car seat on the table. He seemed completely normal whilst doing this. At four months his mother noted that he had rocked the seat to the edge of the table, but before his mother could reach him the seat fell just over a metre onto a concrete floor covered with linoleum. His mother could see him before the fall and was sure that he looked normal. He lost consciousness and was taken to hospital where he remained in status epilepticus for 90 minutes despite repeated doses of diazepam and a loading dose of phenytoin. An immediate cerebral computerized tomography scan was normal as was cerebrospinal fluid. He was ventilated overnight and discharged after 5 days on maintenance phenytoin.

He remained well for two weeks, but his mother noted episodes of stiffness on the left side. He subsequently developed focal epilepsy with secondary generalization. By two years of age he was having frequent myoclonic jerks and generalized and partial seizures that had not responded to various anticonvulsants. Numerous further investigations failed to identify a metabolic cause and cerebral magnetic resonance imaging was normal. He was now severely developmentally delayed in all areas. He had a broad-based ataxic gait, was not transferring, had no speech or comprehension except to understand 'no!', showed marked visual inattention and had no self-help social skills. The patient is now three years old and continues to have intractable epilepsy which has now shown a right-sided focus on the electroencephalogram. He will attend a school for children with severe learning difficulties. Although he clearly sustained a significant head injury at the time of the fall, demonstrated by his prolonged status epilepticus, this may not have resulted in his epilepsy and developmental delay. However, his mother thinks that the incident is causally associated and feels very guilty as a result.

Case 2

An eight-month-old boy was strapped into his car seat which was placed on a refrigerator about one metre above the floor. His parents were in the same room. He wriggled forward and fell whilst strapped into the seat, landing on the slate floor. He cried immediately, but continued to be inconsolable and started vomiting after thirty minutes. He was seen at a local accident department and referred to a nearby neurosurgical unit. He had a four centimetre diameter swelling with bruise on his forehead. He vomited five more times after admission and remained irritable for six hours. He was admitted overnight with a presumed diagnosis of concussion and was discharged with no sequelae the following day.

COMMENT

Car seats have been very effective in reducing injuries[1] although misuse in vehicles can result in trauma[2]. In most such instances, the harness was not connected properly or the safety seat was not secured to the car seat and injury followed a collision. In addition, asphyxia may occur if a child slips in the straps[3].

There have been few reports on injuries associated with car safety seat misuse outside a vehicle. Graham and colleagues[2] reported that, among children under twenty-four months presenting with trauma to the emergency department in Oklahoma, USA, 7% of injuries were caused by car safety seat misuse. Half of these (14 patients) were non-occupant injuries and all of these were in infants under one year old and were caused by falls. The car seat had been placed on the car roof or bonnet (5 cases), on a table (5 cases), or in a shopping trolley (1 case), or the car seat had been dropped (3 cases). The injuries included depressed skull fracture with epidural haematoma (1 case), linear skull fracture (3 cases), cervical vertebral fracture (1 case) and simple head injury (9 cases). There is also a report of a seven-month-old infant who fell onto the floor from the top

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of an active washing machine while restrained in a car seat[4]. He sustained a skull fracture with an epidural haematoma.

Kravitz *et al.*[5] and Helfer *et al.*[6] suggest that children falling from elevated household surfaces seldom sustain serious injury. However, this much cited generalization does not cover falls when infants are restrained. Infants in car seats will be unable to execute their righting reflexes because of the harness. In addition, most car seats weigh about 5 kg, which will be an additional 50–100% of the weight of most four to twelve month old infants involved in these accidents. The impact energy will be much higher and the injuries in these car seats are inevitably more serious. Distinguishing head injuries due to falls from non-accidental injury is a common problem in infancy. If clinicians are unaware that head injuries can be more severe if the fall is in a car seat, they may wrongly suspect that the trauma was non-accidental.

Most patients are made aware by midwives, health visitors and health education leaflets or books of the risks of leaving even seemingly immobile babies and infants unsupervised on raised surfaces. With car seats it seems that many parents and even some health professionals assume that the child is sufficiently restricted not to fall. Previous reports and these cases demonstrate that this is not so.

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Chronic parathyroiditis associated with primary hyperplastic hyperparathyroidism

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Focal lymphocytic infiltration of the parathyroid glands is found at necropsy in up to 10% of patients but is not usually associated with any derangement of parathyroid function in life[1]. We report a case of hyperparathyroidism in an elderly patient associated with a histological picture of chronic parathyroiditis in the operative specimen. This condition has only been reported once before[2].

CASE HISTORY

A woman aged 76 was first seen in 1969 with a calculus obstructing her urethral orifice. This was visible at the external meatus and was easily removed. She returned in 1974 with a left-sided renal calculus which passed spontaneously. Her serum calcium was 2.7 mmol/L (normal range 2.2–2.6) and her serum parathyroid level was 0.66 ng/mL (0.15–0.9). On repeated measurement throughout 1975 and 1976, calcium was always normal. In 1977 a stone in the left renal pelvis was removed by pyelolithotomy and proved to consist of carbonate, phosphate, magnesium and ammonium. In 1978 a stone in the left kidney was removed by pyelolithotomy. In 1979 the parathyroid hormone concentration was again normal at 0.24 ng/mL. In 1984 a left-sided staghorn calculus was removed by a combination of extracorporeal shock wave treatment and percutaneous nephrolithotomy. In 1990, at the age of 71 she was admitted with diabetic ketoacidosis (her 3 sisters and 1 brother were all insulin-dependent diabetics).

In 1991 she was admitted with small-bowel obstruction due to gallstone ileus. Serum gastrin was 43 pmol/L (normal <40) and the serum parathyroid hormone was raised for the first time at 164 ng/L (normal range 10 to 55—the new range representing a change in the units and a change in the assay). A thallium-technetium subtraction scan did not show any parathyroid glands.

Parathyroidectomy was performed in 1992. The left inferior parathyroid gland was red brown in colour, weighed 140 mg and measured $0.8 \times 0.5 \times 0.25$ cm. Frozen section could not distinguish between hyperplasia or an adenoma due to the presence of large numbers of

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